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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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| <b>(54) Title:</b> PAPER WITH IMPROVED SURFACE PROPERTIES AND METHOD OF MAKING THE SAME<br><br><b>(57) Abstract</b><br><br>Paper with improved surface properties, especially printability and coating properties. The invention is characterized in that the paper comprises a surface layer consisting of highly beaten paper pulp, fine material or fibres separated from highly beaten paper pulp and/or fine material, possibly containing fibres, from white water, in an amount of at maximum 10 g/m <sup>2</sup> , preferably at maximum 5 g/m <sup>2</sup> .  |           |  |

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Paper with improved surface properties and method  
of making the same

This invention relates to a paper with improved surface properties, especially printability and coating properties. The invention also relates to a method of making such a paper.

When a paper has been made in a papermaking machine, it is in most cases necessary to treat the paper so as to render it applicable to the purpose in question. Such a treatment can be surface sizing for making the fibre material hydrophobic, or coating, which implies that a pigment dispersed in a binding agent is applied on the paper web. The treatment is very expensive, and it is therefore of interest to take measures, which can reduce the investments in this respect.

The primary object of the present invention is to bring about a uniform, dense, dustless and printable surface on the paper and paperboard and also to obtain an improvement in the bending stiffness without the disadvantages involved with the present state of art.

At the making of printing paper and paperboard it is important, that the product has a uniform and printable surface. The surface is desired to have low dusting tendency and low fibre rise. It is, besides, of great economic value that the product has good rigidity. For single-layer sheets and surface layers in paperboard these properties are achieved to-day by a high energy investment at beating and by admixture of short-fibre pulp. In addition, glazing and in many cases surface sizing and coating are required for obtaining the desired surface quality. Increased beating and admixture of short-fibre pulp result in increased drainage resistance and thereby reduced production. Glazing always implies reduced bending stiffness.

The disadvantages at conventional art are overcome by the present invention.

According to the invention, a paper is produced which comprises a surface layer of highly beaten paper pulp, fine material separated from highly beaten paper pulp and/or fine material from white water in an amount of at maximum  $10 \text{ g/m}^2$ , preferably at maximum  $5 \text{ g/m}^2$ . The material is applied on each side or only one side of a wet sheet already formed. The material can be applied on the wet paper web by means of a head box located separately at the papermaking machine or by means of spray tins.

According to a particularly suitable embodiment, the surface layer consists of a cellulose material with a beating degree exceeding  $30^\circ \text{SR}$ , preferably exceeding  $60^\circ \text{SR}$ .

This thin layer has the capacity of together with the base layer to form a smooth and strong surface with improved printability and coating properties compared to the base material. The advantage of this method compared to the present art is, that the base material requires less beating and smaller amounts of short-fibre pulps, which render dewatering difficult, in order to achieve the same surface finish and surface bonding strength. The advantage thereof is that for paperboard the bending stiffness is improved due to a greater thickness and due to the increase in the modulus of elasticity of the surfaces.

The invention is not restricted to the applying methods set forth, but can be varied within the scope of the invention idea.

Claims

1. A paper with improved surface properties, especially printability and coating properties, characterized in that it comprises a surface layer consisting of highly beaten paper pulp, fine material or fibres separated from highly beaten paper pulp and/or fine material, possibly containing fibres, from white water, in an amount of at maximum  $10 \text{ g/m}^2$ , preferably at maximum  $5 \text{ g/m}^2$ .
2. A paper as defined in claim 1, characterized in that the surface layer consists of a cellulose material with a beating degree exceeding  $30^\circ\text{SR}$ , preferably exceeding  $60^\circ\text{SR}$ .
3. A method at the making of a paper with improved surface properties, especially printability and coating properties, characterized in that a wet paper web already formed is provided with a surface layer consisting of highly beaten paper pulp, fine material or fibres separated from highly beaten paper pulp and/or fine material, possibly containing fibres, from white water, in an amount of at maximum  $10 \text{ g/m}^2$ , preferably at maximum  $5 \text{ g/m}^2$ , and the web thereafter is treated in a manner previously known per se.
4. A method as defined in claim 3, characterized in that the surface layer is applied in the form of a cellulose material with a beating degree exceeding  $30^\circ\text{SR}$ , preferably exceeding  $60^\circ\text{SR}$ .
5. A method as defined in claim 3 or 4, characterized in that the cellulose material is applied through a head box provided separately at the papermaking machine.
6. A method as defined in claim 3 or 4, characterized in that the cellulose material is applied by means of spray tins.

# INTERNATIONAL SEARCH REPORT

International Application No PCT/SE84/00428

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| <b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) *   |   |   |
| According to International Patent Classification (IPC) or to both National Classification and IPC 4  |   |   |
| D 21 H 3/00, 5/14  |   |   |
| <b>II. FIELDS SEARCHED</b>   |   |   |
| Minimum Documentation Searched 7   |   |   |
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| Documentation Searched other than Minimum Documentation<br>to the Extent that such Documents are included in the Fields Searched *   |   |   |
| SE, NO, DK, FI classes as above  |   |   |
| <b>III. DOCUMENTS CONSIDERED TO BE RELEVANT *</b>  |   |   |
| Category *   | Citation of Document, 11 with indication, where appropriate, of the relevant passages 12    | Relevant to Claim No. 13                            |
| X  | US, A, 1 924 573 (BROWN COMPANY)<br>29 August 1933<br>See claims 1-5                        | 1   |
| A  | SE, B, 7014457-1 (W G LOUDEN)<br>9 June 1975<br>& DE, 2052936<br>GB, 1335561<br>US, 3839144 | 1-2   |
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| <b>IV. CERTIFICATION</b>   |   |   |
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| Swedish Patent Office  |   | <i>Barbro Nilsson</i><br>Barbro Nilsson             |